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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,718	02/09/2004	Adlai Smith	38203-6082B	3857

33123 7590 11/29/2005  
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EXAMINER


KOYAMA, KUMIKO C

ART UNIT PAPER NUMBER

2876

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/775,718	<b>Applicant(s)</b> SMITH ET AL. 	
	<b>Examiner</b> Kumiko C. Koyama	<b>Art Unit</b> 2876	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 44-47 and 50-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 44-47 and 50-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

Amendment received on September 19, 2005 has been acknowledged.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 44 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt et al (US 5,805,290, as cited by the Applicant) in view of Ota (US 6,236,448).

Ausschnitt '290 discloses an apparatus for determining overlay error and an overlay target having array elements (Fig 18), and an optical metrology tool is used to measure the array of elements (col 10, lines 33-35). The target comprises four sets of alignment attributes. The first set of alignment attributes 140 is disposed along a first column (Fig 18). The second set of alignment attributes 142 is complementary to the first set of alignment attributes and is disposed along a second column distinct from the first column, wherein the alignment attributes in the first and second sets are aligned in corresponding rows (Fig 18). The third set of alignment attributes 134 is distributed along the first row between the first and second column (Fig 18). The fourth set of alignment attributes 132 is complementary to the third set of attributes and is disposed in a second row distinct from the first row, wherein the alignment attributes in the third and fourth sets are aligned in corresponding columns (Fig 18). Ausschnitt '290 also teaches that the second

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and fourth alignment attributes are complementary to the first and third alignment attributes, respectively, in that an exposure of the second and fourth alignment attributes interlock with a previous exposure of the first and third alignment attributes (Fig 18).

Ausschnitt '290 fails to teach a stage that is shifted in a desired direction relative to the reticle.

Ota teaches a first set of marks shown in Fig. 10(A) and a second set of marks shown in Fig. 10(B). The first set of marks and the second set of marks are superimposed as shown in Fig. (C). Ota further discloses that one alignment observation system AL1 determines the relative position shift between the positions of the reticle mark 42 and the wafer mark 40, while the other alignment observation system AL 2 determines the relative position shift between the positions of the reticle mark 43 and the wafer mark 41 and represent position shift components in X-direction and Y-direction. Then the reticle stage 5 is minutely moved in an attempt to reduce all of these position shift components to zero (or to values less than a predetermined reference value). The alignment is thus achieved. Once the alignment is achieved, the exposure operation is started by emitting exposure light beam. During the exposure operation, the alignment operation is continued (col 12, lines 4-20).

Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to integrate the teachings of Ota to the teachings of Ausschnitt '290 because the stage provides movements in smaller increments and thereby the system is able to provide a more minute adjustment to accurately align the reticles in its proper position with zero shift.

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3. Claims 45 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt '290 as modified by Ota in view of Dao et al (US 5,700,602, as cited by the Applicant). Ausschnitt '290 as modified by Ota have been discussed above.

Re claim 45 and 47: Ausschnitt '290 as modified by Ota fails to disclose that the reticle has reduced transmission.

Dao discloses an attenuated phase-shifting reticle that uses an embedded film, which is engineered to have a reduced transmission (col 2 lines 7-10).

In view of Dao, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to employ the teachings of Dao to the teachings of Ausschnitt '290 as modified by Ota in order to minimize effects of diffraction, therefore resulting in more accurate reading of overlay measurement and improve the overlay alignment.

4. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt '290 as modified by Ota and Dao as applied to claim 45 above, and further in view of Fukuda (US 5,262,257, as cited by the Applicant). Ausschnitt '290/Ota/Dao have been discussed above.

Ausschnitt '290/Ota/Dao fails to teach a reticle comprising a partially reflecting dielectric coating.

Fukuda discloses an alignment patter of a mask formed by a dielectric material film 36 (col 3 lines 32-34).

In view of Fukuda, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to employ the teachings of Fukuda to the teachings of Ausschnitt '290/Ota/Dao as modified by Dao in order to reflect the light and acquire proper image of the patter for overlay alignment.

5. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt et al (US 5,805,290, as cited by the Applicant) in view of Chaney (US 5,056,921).

Ausschnitt '290 discloses an apparatus for determining overlay error and an overlay target having array elements (Fig 18), and an optical metrology tool is used to measure the array of elements (col 10, lines 33-35). The target comprises four sets of alignment attributes. The first set of alignment attributes 140 is disposed along a first column (Fig 18). The second set of alignment attributes 142 is complementary to the first set of alignment attributes and is disposed along a second column distinct from the first column, wherein the alignment attributes in the first and second sets are aligned in corresponding rows (Fig 18). The third set of alignment attributes 134 is distributed along the first row between the first and second column (Fig 18). The fourth set of alignment attributes 132 is complementary to the third set of attributes and is disposed in a second row distinct from the first row, wherein the alignment attributes in the third and fourth sets are aligned in corresponding columns (Fig 18). Ausschnitt '290 also teaches that the second and fourth alignment attributes are complementary to the first and third alignment attributes, respectively, in that an exposure of the second and fourth alignment attributes interlock with a previous exposure of the first and third alignment attributes (Fig 18). Ausschnitt '290 further teaches that his invention provides a process for determining critical dimension bias or overlay error in a substrate formed by a lithographic process by initially providing an array of elements on a substrate, the array comprising a plurality of spaced, substantially parallel elements having a length and a width. The sum of the width of an element and the spacing of adjacent elements define a pitch of the elements (col 3, lines 1-5).

Ausschnitt '290 fails to teach determining a stage distortion and yaw error map.

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Chaney discloses deviations in the movement of a machine component along its main movement axis generally involve rotation of the component about one or more axes of the machine, usually referred to as the x, y and z axes, and are referred to as pitch, roll and yaw error (col 1, lines 10-17). The pitch and roll errors are considered as a stage distortion.

Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to integrate the teachings of Chaney to the teachings of Ausschnitt '290 because in order to accurately position the reticles at its designated position, it is necessary for the apparatus to properly function and move as directed. Such modification ensures minimal error in the positioning of the reticle and also provides a faster lithography process by quickly positioning the reticle.

6. Claims 52 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt '290 as modified by Chaney in view of Dao et al (US 5,700,602, as cited by the Applicant). Ausschnitt '290 as modified by Ota have been discussed above.

Re claim 45 and 47: Ausschnitt '290 as modified by Chaney fails to disclose that the reticle has reduced transmission.

Dao discloses an attenuated phase-shifting reticle that uses an embedded film, which is engineered to have a reduced transmission (col 2 lines 7-10).

In view of Dao, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to employ the teachings of Dao to the teachings of Ausschnitt '290 as modified by Chaney in order to minimize effects of diffraction, therefore resulting in more accurate reading of overlay measurement and improve the overlay alignment.

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7. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt '290 as modified by Chaney and Dao as applied to claim 45 above, and further in view of Fukuda (US 5,262,257, as cited by the Applicant). Ausschnitt '290/Ota/Dao have been discussed above.

Ausschnitt '290/Ota/Dao fails to teach a reticle comprising a partially reflecting dielectric coating.

Fukuda discloses an alignment patten of a mask formed by a dielectric material film 36 (col 3 lines 32-34).

In view of Fukuda, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to employ the teachings of Fukuda to the teachings of Ausschnitt '290/Chaney/Dao as modified by Dao in order to reflect the light and acquire proper image of the patten for overlay alignment.

### *Response to Arguments*

8. Applicant's arguments with respect to claims 44-47 and 50 have been considered but are moot in view of the new ground(s) of rejection.

Applicant amended claims 44 and 50 with new limitation, such as "stage has been shifted in a desired direction relative to the reticle." Such new limitation necessitated new search and consideration. Therefore, this action is Final.



*Conclusion*

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kumiko C. Koyama whose telephone number is 571-272-2394. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on 571-272-2398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Kumiko C. Koyama  
November 28, 2005

  
KARL D. FRECH  
PRIMARY EXAMINER